

School of Kinesiology
Faculty of Health Sciences
Western University

**KIN 3457 – Cognitive Ergonomics
2016-2017**

Instructor:	A. Salmoni	Office:	TH3159b
Location:	HSB236	Office Hours:	upon demand
Lectures:	Tuesdays 2 hrs Thursdays 2 hrs	Phone:	519-661-3541
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TAs: Cassie Ellis & Phil Parrot-Migas

NOTE: All course information including assignment outlines, deadlines, etc. are available via OWL. Also note the class has 4 hours of class time. **Students are expected to attend all 4 hours each week.**

Calendar Description: Cognitive ergonomics is concerned with mental processes, such as perception, decision making, memory, reasoning, and response execution, as they affect interactions among humans and other elements of a work system. Relevant topics include skilled performance, attention, distraction, human error, work stress, risk perception, and Kansei engineering as these may relate to human-system design, safety and productivity. Assessment methodologies include hierarchical task analysis, cognitive task analysis, mental workload, human error identification/accident investigation, and situation awareness assessment.

My Course Description: Cognitive ergonomics is concerned with how mental processes affect interactions among humans and other elements of the system to affect safety and productivity. Relevant topics include safety culture/climate, risk perception, accident analysis, attention and distraction, product design, injury prevention, and productivity. Ergonomic tools include: behavioral observation, hierarchical task analysis, usability analysis, safety culture assessment, safety audit. ***It is very important to note that while the description above is focused on content topics, the course is predominantly aimed at acquainting students with how cognitive ergonomists think. In this light, class/assignment process is much more important than topical content.***

Course/Class Format:

Lectures, presentations, and discussions: prior to the beginning of each new topic, students are expected to search for information related to the topic to be covered and come to class prepared to talk about what they have learned.

I will spend the first 15 minutes of each class answering questions and discussing assignments. While you do not need to attend the first 15 minutes, the following rules hold:

- I do not want to answer assignment-based questions by email, particularly if the question was dealt with in class (I will simply tell you to consult a friend)
- If you come to class late, I expect you to do so unobtrusively

I expect all cell phones to be turned off and out of sight during lectures. If your computer is on I assume you are not sending emails or playing a game.

Course Objectives:

As the course professor, I care more about students learning to think than learning about content. I challenge each student to listen to class discussions carefully (not distracted by cell phones etc.), think critically about what people say, and to add their own critical and creative thoughts into the discussion.

1. To teach students to think about and discuss issues germane to both ergonomic research and consulting. The learning culture for this class is to treat students as ergonomic consultants and to expect their behavior to mimic that of a professional in the field.
2. To introduce students to example concepts/topics in cognitive ergonomics.
3. To provide students with practical experience using some of the knowledge and methodologies employed in the field to understand safety promotion/injury prevention, work design, and work/job assessment.
4. Have students:
 - Practice being a professional (having pride in your work) with minimal direction,
 - Focus on application-based assignments,
 - Practice being a self-directed and self-reflective learner (i.e., student to be a co-learner and co-leader in the course).
5. To promote the development of:
 - Effective listening skills,
 - Critical reading & thinking,
 - Creative thinking,
 - Effective search skills,
 - Strong writing skills.

Required Course Material:

Students are expected to read extensively, particularly material related to assignments (electronically available textbooks below are excellent resources for many topics).

Lecture material will provide (ONLY) a foundation or “jumping off point” for assignments with students needing to read on their own to fill gaps in their understanding. Professor Salmoni is always available to discuss questions arising. **E1-Compendex is an excellent database to search for safety topics.**

Texts from which some topics/materials for the course have been gleaned:

- N. Stanton, A. Hedge, K. Brookhuis, E. Salas, & H. Hendrick (2005). Handbook of Human Factors and Ergonomics Methods. NY: CRC Press. [available on line from Library]
- N.A. Stanton, P.M. Salmon, G.H. Walker, C. Baber, & D.P. Jenkins (2005). Human factors methods: A practical guide for engineering and design. Burlington, VT: Ashgate Publishing Ltd.(available on line from Library)

Potential Lecture Topics (topics may change or the ones below may not be covered)

As one might imagine, cognitive ergonomics is a vast field that covers a multitude of topics. My intent for the lectures is to provide a few topical examples. Most importantly, my goal in the class is to get you to think as an ergonomist. For example, many students in past classes said the course changed how they see the world. They see safety issues that before the class would have gone unnoticed.

Major and minor assignment discussion (1st 15 minutes of each class)

Introduction: What is Cognitive Ergonomics – information processing, micro and macro ergonomics, a systems approach

Hierarchical task analysis (HTA)

Organization and safety culture

Risk perception & risk homeostasis

Mental Workload assessment

Attention, distractions, cell phone use & driving safety

Safety of playground equipment & children's risk taking

Product design & usability

**Note that there are FOUR hours of class time per week. Some portion of the extra time will be allotted to group work sessions for assignments.

Course Evaluation

1. Quizzes (30%)
2. Assignments* (70%)
 - Major assignment (35%)
 - Written report (25%)
 - Presentation (10%)
 - Hierarchical task analysis at Beer Store (15%)
 - Mental work load (15%)
3. Self reflection (5%) – you as a learner in the course (handed in on the last day of class – 1-2 page assessment of your performance)

Quizzes (9)

An (usually research) article will be assigned for classes during the semester. The articles will be posted electronically on OWL. The articles will be posted 2-3 days in advance. It is the student's job to check for these articles. Students should note that I have attempted

to find shorter articles, but occasionally this will not be possible. **You will need to learn how to enjoy this reading process (Ask Prof Salmoni for suggestions on how to do this).**

For each quiz students will be given 5-10 minutes to answer a brief question. The question will usually have two parts:

- A fact from the article to regurgitate
- A question requiring critical/creative thought

[Integrity] – I expect you not to cheat by looking at your neighbors answer or looking at the article on your computer or cell phone. Remember it is your integrity you are displaying if you cheat.

Your mark (30%) will be based on your best 8 performances. If students are going to miss a quiz I expect to be notified before class time.

Assignments

There will be 2 minor and 1 major assignment during the course. *It is important for the student to recognize that the amount of work they put into an assignment may not be proportionate to the value given to the assignment or the mark you get.*

In concert with my learning objectives for you, I will expect much of the work you do on assignments to be self-directed. I will provide little in the way of rubrics and explicit direction for the assignments. However, I expect teams to come to class ready to discuss issues they are having in completing the assignments (***I expect teams to do work first, including lots of reading, before asking questions***). The lectures I give will focus on providing students with mental models to help direct their thinking during assignments.

Late submissions: Assignments will lose 33% per day late (first late day begins at 4:01 pm of the assignment due date), unless permission to hand the assignment in at an alternate time/date is granted prior to the assignment due date. Submission dates are discussed and agreed upon when assignments are given to students.

Minor Assignments (done in teams of 1-3 students)

Assignments will be spelled out in class:

- HTA assessment
- Mental workload assessment

Major Assignment Topics (you will pick a topic and work on a subgroup team of 3-5 students)

Ergonomists are often hired to solve problems that revolve around safety issues, although their scope of work can often go well beyond safety. This is particularly true because safety is always embedded in a larger picture and organizational

structure. For example, safety culture is always embedded in a larger organizational culture which involves all other aspects of an organization including making money and providing services. This means that people's actions around safety are always part of a much bigger picture since many factors can affect safety and safety practice/injury prevention (e.g., working efficiently, making money, having fun).

Unlike past years when I have chosen one assignment for the entire class, I have decided this year to provide several options from which students can choose. In all cases students will work in subgroups of 3-4 students (each subgroup member will get the same grade for this aspect of the grades for the course). These subgroups will also be embedded in the bigger group (all those students working on a particular problem). Of course, however, we will also function as an entire class and everyone's learning will be embedded within all of the class projects. To reinforce this latter aspect of the class I will devote the first 15 minutes of every lecture to class discussion revolving around project work. It will be each students' responsibility to use this time to learn how to think, listen actively, and ask focused questions.

Please note that you should not choose your topic because you think one topic is easier than another. I will expect that all people involved in any of these projects will go far beyond what you think is "enough". Indeed, I will not tell you what is enough effort/product. I want you to do these projects with as little direction from me as possible and with a huge pride in your work. **I read a book this summer about teaching innovative thinking which included a very cool quote. The author said that university professors need to change from being, "the sage on the stage, to the guide on the side". I plan to be the guide on the side in all of my courses this year.** The book also suggested that the most important aspect of a university education was for students to find their passion. Please pick your topic below because you feel a passion for the issue.

Problem 1 – Texting and Driving/Walking

Texting while driving (and similarly texting and walking on campus) is a very large safety issue in today's society. Last year during our pedestrian safety class projects, not surprisingly we found many drivers and pedestrians who admitted (and were seen) texting while driving or walking on campus. Your group has been asked to gain an understanding of the texting/driving and texting/walking culture (values and beliefs surrounding these activities) at Western. Following data gathered to understand the safety culture, each subgroup will create a safety campaign (you can look at MADD campaign and other safety campaigns to get some ideas) designed to minimize these behaviours. The toxic mix between driver and pedestrian distraction was one reason why last year's class fought so aggressively against allowing light rail on the inner campus and why they favoured a car free and bus free inner campus. It is relevant to this project that the city is now putting great pressure on the University to allow rapid transit busses on the inner campus (which in my opinion is an equally unsafe plan). Both subgroup presentations, as well as an

overall group presentation will be made. The subgroup presentations will be made to the class and the overall presentation will be made to Western's chief of police.

Problem 2 – Homecoming

Homecoming at Western is a nationally recognized weekend celebration. In fact, Western boasts the largest homecoming in Canada. With this success, however, has also come some serious safety problems, many of which revolve around drinking. Recently, homecoming for students has become a celebratory weekend for which the annual football game and street parties (residence/house parties included here) are major events. For the past 2-3 years the Broughdale Avenue street party has caused a large degree of angst among city and university officials. The task for the groups working on this project is twofold. First, there is a need to understand the "drinking culture" at Western, which is most prominent at times like Homecoming and St. Patrick's day, but is part of the student culture throughout the school year as well. For example, a Kin student from last year's fourth year told me that the majority of the "fun" activities at Western seem to also involve drinking! He claimed it was difficult to find "fun events" that did not involve alcohol. These comments exemplify for this student aspects of the "drinking culture" at Western. The second part of this issue is to make suggestions of alternate activities that might minimize drinking and replace the drinking behaviour with other highly valued activities (i.e., change the culture of Homecoming). It is important to note that this issue is particularly important to Western's President Chakma as the City has put much pressure on the University to solve the Broughdale problem (e.g., city spends a great deal of money policing homecoming events). One idea of alternate activities might be to make much better use of the thousands of alumni who return to campus and in particular how they might engage with current students to help further their education and ultimately their careers. In addition to the above deliverables, each subgroup will make a presentation to the class and an overall presentation will be made to Western's President Chakma.

Problem 3 – Pedestrian Safety at Alumni Circle

One of the results of last year's 3457 class working on campus pedestrian safety was an agreement by all (informed by the evidence/data we collected) that something needed to be done to make Alumni Circle a safer place for pedestrians. The result of this realization is the changes to Alumni Circle that were made in August before students arrived back this fall. As with any safety initiative, it is important to assess whether the changes made actually produced the desired effect (caused improvements in safety). This group's task is to assess whether safety behaviour (many cars entering the circle not stopping at stop signs or pedestrians j-walking) has changed and safety has improved. A first step in this will be to describe current pedestrian/car/bus behaviour, including attitudes about safety. In addition, feedback about the changes by the different user groups can be gathered. It may then be possible to compare this new data to last year's data. In addition, it may be necessary/desirable to recommend further changes (e.g., I think lighting should be

improved for night time safety). As with the other projects, subgroups will make class presentations with their findings and recommendations and an overall presentation will be made to Mike McLean, Manager, Planning and Design (Mike is part of the committee that sponsored the changes made) and Western's Chief of Police.

Problem 4 – North to south pedestrian travel on campus

Like any neighborhood or city, there are often used travel corridors on campus, and in particular in this case, pedestrian travel corridors. In addition to flow to classes there are other much-travelled corridors. The one of interest to the university is the north-south pedestrian travel corridor roughly between the natural science complex on the north and the campus rec center on the south. There are roughly two routes here: one route goes in front of Thames Hall and UCC, the other goes in front of UC and the F-K Sport Medicine clinic. This corridor is interesting to the evolution of Western, because up until the Rec Center was built in its current location, there was less need for this flow (i.e., when new buildings are constructed they affect pedestrian flow). One of the other interesting aspects of this corridor is the fact that at night time busses are allowed to travel down the road in front of UCC and Thames Hall. This “night time” bus route was a safety initiative to make students feel safer at night when leaving the library to catch the bus. One might argue though that this change actually made pedestrians less safe as it relates to interacting with traffic. The deliverables for this project are first to describe the north-south pedestrian traffic flow. A second deliverable is to describe the obstacles to a smooth flow (e.g., interaction with traffic at different points between Nat Sci and the Rec Center). A third deliverable is to determine whether allowing busses to use the street in front of Thames Hall is a better option than turning this into a pedestrian mall free of bus and car traffic.

COURSE/UNIVERSITY POLICIES

1. **Written documentation:** Whenever possible, students who require academic accommodation should provide notification and documentation in advance of due dates, examinations, etc. stating specific reasons and dates. Students must follow up with their professors and their Academic Counselling office in a timely manner. Documentation for any request for accommodation shall be submitted directly, as soon as possible, to the appropriate *Academic Counselling Office* of the student's Faculty/School of registration not to the instructor, with a request for relief specifying the nature of the accommodation being requested. This documentation should be obtained at the time of the initial consultation with the physician or walk-in clinic. These documents will be retained in the student's file, and will be held in confidence in accordance with the University's Official Student Record Information Privacy Policy. See <https://studentservices.uwo.ca/secure/index.cfm> for specific policy and forms relating to accommodation.

2. **Grades:** Assignments with "slim rubrics" will be posted on OWL. Should you have a concern regarding the grade you received for an assignment or feel that it is unfair in any way, you should make an appointment to meet with the course instructor. Please be aware that in requesting a grade reassessment, your grade could go up/down/or stay the same.

3. **Scholastic offences:** They are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:
http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf.

A) Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar). All required papers might be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com (<http://www.turnitin.com>)

4. **Formatting:** No specific format is required, however, students need to cite the reference material used and write in a concise and effective manner, to parallel that of a professional report. In addition, things like report length are often intentionally not specified. Each report must be written to effectively address/answer the issue/problem posed.

5. **Classroom Behaviour:** Classes will begin promptly at the time specified at the top of page one of this syllabus. In the event that you must arrive late, please enter the classroom with minimal disturbance to the class. **Cell phones are not allowed to be used in class and laptops only for note taking.** Since there are no exams there is no need for detailed note taking. A pen and pad will be sufficient note taking. **A student's primary job is to sit and listen carefully, asking questions, and actively participating in classroom discussion.** Students are expected to attend every class.

STUDENT CODE OF CONDUCT

The purpose of the Code of Student Conduct is to define the general standard of conduct expected of students registered at Western University, provide examples of behaviour that constitutes a breach of this standard of conduct, provide examples of sanctions that may be imposed, and set out the disciplinary procedures that the University will follow.

For more information, visit

<http://www.uwo.ca/univsec/board/code.pdf>

ENGLISH PROFICIENCY FOR THE ASSIGNMENT OF GRADES

Visit the website <http://www.uwo.ca/univsec/handbook/exam/english.pdf>

SUPPORT SERVICES

There are various support services around campus and these include, but are not limited to:

1. Student Development Centre -- <http://www.sdc.uwo.ca/ssd/>
2. Student Health -- <http://www.shs.uwo.ca/student/studenthealthservices.html>
3. Registrar's Office -- <http://www.registrar.uwo.ca/>
4. Ombuds Office -- <http://www.uwo.ca/ombuds/>